MASSES ANI) DENSITIES OF PLUTO ANI) CHARON

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We have analyzed *Hubble Space Telescope* Wide Field Camera CCD images of Pluto, Charon, and a background star, obtained on seven *HST* visits over a 3.2-day span in August 1991, to observe Pluto's barycentric motion and to determine the individual masses and bulk densities of Pluto and Charon. The results given here summarize the detailed presentation to appear in the June 1993 issue of AJ. The most fundamental new result was an accurate solution for a previously undetermined parameter, the Charon/Pluto mass ratio q; the new solution is $q = 0.0\,S3721\,0.0147$. Significant accuracy improvements by almost a factor of two were obtained for Charon's orbital semimajor axis, $a = 19'105{:}1\,86$ Ii Ill and the Pluto system mass, $\mathcal{M}_{sys} = (1.401 \pm 0.019) \times 10^8$ inverse solar masses. The Pluto and Charon masses were $\mathcal{M}_P = (13.10 \pm 0.24) \times 10^{24}$ g and $\mathcal{M}_C = (1.10 \pm 0.18) \times 10^{24}$ g, respectively. Computed densities depend strongly on the assumed radius values. Assuming radii determined from mutual event observations by Tholen & Buie (BAAS 22, 1129, 1990) then the density of Pluto is $\rho_P = 2.13 \pm 0.01$ g/cm^3 and the density of Charon is $\rho_C = 1.30 \pm 0.23$ g/cm^3. Later analysis of Pluto stellar occultation data (Elliot & Young, AJ 103, 991, 1992) indicated that Pluto atmospheric transmission for mutual events and stellar occultations may have a significant effect on determination of the Pluto Sill'fil('(' radius R_P. The R_P value from their "thermal-gradient" atmospheric model implies $\rho_P = 1.78 \pm 0.06$ g/cm^3 and the R_P value from their "haze" model implies $\rho_P \geq 1.90$ g/cm^3. All these values for ρ_P are significantly higher than the solution value for ρ_C. We will also describe our new HST observing program GO4292, which will acquire seven new WFC observations of Pill(c), Charon, and a background star in early August> 1993. This program, if successful, will verify and improve the present mass and density results.